

Claims

[c1] 1. A pre-crash sensing system coupled to a countermeasure system having at least a first countermeasure and a second countermeasure comprising: a vision system generating an object size signal and an object distance signal; and a controller coupled to said vision system for deploying either said first countermeasure or said first and second countermeasures in response to said object distance signal and said object size signal.

[c2] 2. A system as recited in claim 1 wherein said vision system comprise a stereo pair of cameras.

[c3] 3. A system as recited in claim 1 wherein said object size comprises height.

[c4] 4. A system as recited in claim 1 wherein said object size comprises object area and object height.

[c5] 5. A system as recited in claim 1 further comprising a vehicle speed sensor generating a speed signal corresponding to the longitudinal speed of the vehicle; wherein said controller activates said countermeasure system in response to the longitudinal speed signal.

[c6] 6. A system as recited in claim 1 further comprising a decision zone; wherein said vision sensor detects an object and generates an object distance signal from an object within said decision zone.

[c7] 7. A method for operating a pre-crash sensing system for an automotive vehicle having a countermeasure system, said method comprising: establishing a decision zone relative to the vehicle; detecting an object within the decision zone using a vision system; determining an object distance and relative velocity using a vision system; determining an object size; and activating the countermeasure system in response to the object size and relative velocity.

[c8] 8. A method as recited in claim 7 wherein determining object size comprises

determining an object height; wherein activating the countermeasure system in response to the object size comprises activating the countermeasure system in response to the object height.

- [c9] 9.A method as recited in claim 7 wherein determining an object size comprises determining an object cross-sectional area; wherein activating the countermeasure system in response to the object size comprises activating the countermeasure system in response to the object cross-sectional area.
- [c10] 10.A method as recited in claim 7 wherein determining an object size comprises determining an object cross-sectional area and object height; wherein activating the countermeasure system in response to the object size comprises activating the countermeasure system in response to the object cross-sectional and object height.
- [c11] 11.A method as recited in claim 10 wherein determining an object cross-sectional area comprises determining the object cross-sectional area with a vision system.
- [c12] 12.A method as recited in claim 7 wherein detecting an object within the decision zone comprises detecting the object within the decision zone with a stereo pair of cameras.
- [c13] 13.A method as recited in claim 7 wherein prior to the step of activating, choosing the first countermeasure or the first countermeasure and the second countermeasure in response to said object size.
- [c14] 14.A method as recited in claim 7 wherein determining an object size comprises determining the vehicle orientation; wherein activating the countermeasure system in response to the object size comprises activating the countermeasure system in response to the object size and vehicle orientation.
- [c15] 15.A method as recited in claim 7 further comprising establishing a decision zone in front of the vehicle.
- [c16] 16.A method as recited in claim 15 further comprising detecting an object within the decision zone; and activating the countermeasure in response to

detecting an object within the decision zone.

[c17] 17. A method as recited in claim 7 wherein activating the countermeasure system comprises activating a first countermeasure comprising pre-arming airbags and pretensioning motorized belt pretensioners, or activating the first countermeasure and a second countermeasure wherein said second countermeasure comprises adjusting the host vehicle suspension height in response to object size and orientation.

DEPARTMENT OF DEFENSE